Is bigger better? Film success in small countries – the case of Scotland, Ireland and Denmark.

Robin MacPherson

Professor of Screen Media and Director, Screen Academy Scotland, Edinburgh Napier University, 10 Colinton Road, Edinburgh EH10 5DT
r.macpherson@napier.ac.uk

ABSTRACT

Small European countries with low levels of film production might be expected to suffer from diseconomies of scale and other structural disadvantages that would tend to produce a lower ratio of 'hits' to 'flops' than larger countries. Analysis of Scottish, Irish and Danish data suggests that, despite significantly different levels of production, the distribution of 'hits' is in fact very similar and consistent with the Paretian distribution of audiences and revenues in major markets such as the United States and others. The skewed distribution of cinema audiences in Scotland, Ireland and Denmark appears to confirm the 'scale independent' importance of a small number of unpredictable high-performing 'outliers' in determining total and average audience/revenues. Analysis of overall production levels and aggregate audience share for domestic films in several small countries reveals a correlation that emerges once production exceeds a critical level. A predictive model of how revenues are distributed as production levels increase is tested. The implications of a consistent pattern of film success for film funding policy in small countries are discussed and avenues for further research suggested.

1 INTRODUCTION

1.1 Small countries and uncertainty

Film industry practitioners and cultural economists alike have, over the past couple of decades, become equally familiar with William Goldman's adage 'nobody knows anything' (Goldman, 1983). The now substantial body of research pioneered by Arthur De Vany, David Walls and others[1] has added methodological rigour and detailed analysis of a very substantial body of research data, to the individual professional experiences and observations of film industry practitioners, affirming the enduring and seemingly universal truth that uncertainty is an inescapable and profoundly significant dimension of success and failure in the film and indeed many other cultural industries.

Thus far, however, little attention has been paid to whether the patterns of success and failure at the box office that have been observed in the economic heartland of the film industry – Hollywood – and in other major markets including the United Kingdom, are replicated in the smaller nations of Europe or indeed elsewhere.

[1] See De Vany (2004) and Walls (2005) and related analysis of a number of other film markets including Australia (McKenzie, 2007) Germany (Jansen, 2005) and the UK (Elliott and Simmons, 2007)

For filmmakers, policymakers and interested observers - academic or otherwise - in small countries such as my own, Scotland, there are at least two *prima facie* reasons to be interested in how far films, audiences and market dynamics do or do not mirror the major economies. The first reason is that in small countries, just as in Hollywood, producers, executives, investors, public agencies, politicians and others would all dearly love to know if there was a formula or system or policy that could significantly improve critical or commercial success rates and thereby reduce investment risk.

The second, more specific reason to look at the dynamics of film performance in small countries, in Europe at any rate, is that there are (or at least there is a widely shared and enduring consensus that there are[2]) major structural barriers to securing a significant domestic market share for indigenously produced films or a sustainable local production industry without the requirement for substantial and continuing public subsidy in one form or another. We do not have space to rehearse here the generally accepted explanations for this market failure. However for our purposes it is worth noting that so far no-one appears to have examined empirically whether the stochastic features of film performance have any specific significance for small countries, where domestic output competes for audience share with Hollywood imports and where the volume of domestic films may be very small indeed.

1.2 Evidence for the Scottish film industry

Scotland is one such country. Like many in Europe, its cinema audience is largely in thrall to Hollywood, its filmmakers struggle to get their work produced and those films which manage to secure distribution generally fail to achieve much of an audience. Yet at the same time a not insubstantial number of films and filmmakers have achieved widespread critical acclaim and some have enjoyed widespread commercial success. The heights of cinematic achievement that have been scaled by films such as *Local Hero (1983)*, *Trainspotting (1996)*, *Sweet Sixteen (2002)*, *The Magdalene Sisters (2002)* and *The Last King of Scotland (2006)*, and the international cachet of names such as Bill Forsyth, Lynne Ramsay, Peter Mullan or David Mackenzie demonstrate the qualitative capacity of Scottish cinema even if, quantitatively, it has, as we will see, failed on the whole to make much of a dent in its domestic far less the international market.

There has been a perception in Scotland, and indeed further afield, that its film industry punches above its weight, certainly critically if not commercially. This no doubt echoes similar sentiments in other countries and is an understandable, indeed arguably a necessary posture to adopt when, for example, lobbying for public investment. It is however a testable claim, even in relation to critical as distinct from commercial success. In the Scottish context the critical claim has yet to be examined in any rigorous way but the commercial performance of Scottish films has already been subject to some

---

[2] See for example Hartog (1883) Sorlin (1991) Hill (1994) Miller (1996) Todd (2000) European Commission (2001) House of Commons (2003) Parker (2003) Acheson & Maule (2005)

stinging criticism from key public and industry figures.[3] As public funds for the arts and creative industries come under increasing pressure the industrial arguments that have been made for public investment in the Scottish film industry are likely to receive more scrutiny than ever before. For better or worse any such scrutiny will have the benefit of being able to draw on the accumulated evidence from almost twenty years of sustained investment in Scottish film-making, albeit at levels much lower than in comparable European countries.

Successive public agencies[4] from the establishment of the Scottish Film Production Fund in 1982 up to the dissolution of Scottish Screen and the assumption of its functions in 2010 by a new creative industries agency, Creative Scotland, have determined the policy and funding framework for supporting Scottish film across both its commercial and cultural dimensions. This framework is broadly similar in structure and function to those found in almost every other European country with the exception that it exists within the wider context of the UK. As in other spheres Scottish cinema thus inhabits a stateless nation within a multinational state. This brings comparative benefits, for example in the form of dual funding structures, and disbenefits, for example in not having access to distinct fiscal levers. For a number of reasons, ranging from internal structural change in the organisation of film support structures (the establishment of Creative Scotland noted above) to the fiscal effects brought about by the global financial crisis, the public policy context for Scottish filmmaking is at a significant point of transition.

Unlike at previous turning points in Scottish film, around the early 1980s and the mid 1990s, when those debating and forming policy could be quite selective about the evidence they adduced against a background of sporadic investment and production, today Scottish cinema faces a potentially much more difficult debate about both its past performance and future prospects (MacPherson, 2009). Add to more than eighty years of Hollywood hegemony in the European screen industry the conjunction of global recession, major cuts in public funding, rapidly changing technology, business models and consumer behaviour, the challenges facing Scottish cinema, as in other small countries, are considerable. A good reason, then, to examine the evidence we have as closely as possible to ensure that those in positions of influence don't rush to hasty conclusions or form judgements that at first sight may be consistent with the data but on closer inspection may overlook more complex underlying dynamics.

Aside from its contribution to the economy or to developing the art of the cinema, there is a third dimension to the film industry in a small country like

[3] See evidence to the Scottish Broadcasting Commission by the CEOs of Scottish Enterprise and the Producers Association for Cinema and Television quoted in MacPherson (2009).

[4] For the purposes of this paper we are concerned with narrative feature film production since its generally acknowledged 'modern' era commencing in 1980. We are therefore not dealing with the period dominated by interventions in documentary and short film making by the Government-sponsored 'Films of Scotland' between 1954 and 1982 or sporadic earlier initiatives to establish some form of regular film production, for a history of which see Dick (1990) and Petrie (2000).

Scotland that deserves to be part of any broadly based review of 'performance' – and that is the audience. The direct and indirect social and cultural benefits of a substantial national cinema, one which can routinely reach a significant[5] portion of the overall audience and indeed particular segments of that audience – such as children and young people whose tastes and expectations are the precursors of tomorrow's adult audience – with films that reflect, celebrate or critique their specific identity and experiences. A concern to examine how well the Scottish audience is being served by its cinema has thus been a major motivation for this research.

1.3 Scottish film performance in a European context

As has already been suggested it is not that uncommon for sympathetic observers to paint a fairly upbeat picture of Scottish cinema by selectively citing particular commercial or critical successes over the three decades since it emerged in its modern form around 1980[6]. Equally, as in other countries journalistic attention often alights on conspicuous examples of public funds seemingly wasted on projects which in hindsight are considered to have been obviously destined to failure. Policy makers, meanwhile, have become increasingly concerned with answering the question "why is there no business model for profitable films?" (David Graham & Associates, 2003)

Even a cursory examination of production, commercial returns or audience levels for indigenous films would quickly reveal an uncomfortable truth for anyone concerned with the cultural or commercial sustainability of Scottish filmmaking. To put it baldly, while enjoying a level of cinema attendance per person second in Europe only to France, Scotland only manages to produce around 1.2 films per million of its population. This puts it on a par with countries in the developing world rather than the average 6.27 for the 'developed' nations of Western Europe, North America and Australasia (Cocq and Levy 2006).

Were we to construct a league table of Western European country's film output, Scotland would come bottom at 0.04 films per $bn of GDP while Denmark, producing four times as many films would come out top at 0.16 films per $bn of GDP. Arguably the most serious challenge to the idea that either its film industry or domestic cinematic culture is in good health comes from the evidence we are about to examine which indicates that the audience for Scottish films in Scotland has fallen sharply since the early 1990s.

There are of course other important measures of success than audience levels. Creative innovation need not, and indeed some (Bourdieu, 1993) would say generally will not produce immediate box office returns if the reproductive health of cinema is to be assured[7]. Equally there are complex

---

[5] The definition of 'significant' is bound to be debated but given the 20% market share or less typical of European countries in the 1970s and 1980s was routinely cited as a cause for concern, figures in low single figures – e.g. Ireland – or less e.g. Scotland would seem to qualify as sub-optimal at the very least.

[6] See P, Neely (2008) Petrie (2000) and Martin Jones (2009)

[7] For an interesting empirical analysis of 'commercial' versus 'artistic' success see Holbrook & Addis (2008)

and historically embedded economic, cultural, social and political factors which underpin the bald statistics of production levels, domestic audience share, international sales revenues and so on. Some of these variously exacerbating or mitigating factors may be specific to small countries (e.g. limited domestic market versus the benefits of a cohesive national identity), though many are shared across Europe (e.g. the destructive effects of two world wars on domestic production or the benefits of linguistic barriers) and indeed some with much of the (non U.S. world) from Quebec to New Zealand.

Neither should we overlook the concerted European effort over the past three decades, both nationally and at a pan-European level, to redress with subsidies, tariffs and other mechanisms what is regarded as the market's failure to ensure the full range of cultural, social and economic benefits from a European film industry and culture. Scotland, Ireland and Denmark have been no strangers to these interventions both domestically and through accessing support systems such as the EU MEDIA programme.

All that said the growing impression that these various interventions appear to be failing, despite notable individual successes, to achieve a structural change in Scottish context, has been an additional to this research.

1.4 Initial investigations

Lacking any consistent collection of film industry statistics specific to Scotland, in early 2009 I began constructing a dataset of Scottish film performance since the 1980s including admissions, box office takings, budget and other variables including for example the Director's opus, awards won, extent of public investment etc.

An initial analysis of box office data between 1993 and 2007, the period for which there is reasonably robust data showed, perhaps not unexpectedly for such a small industry, great variability in the performance of individual films but also considerable variation in the aggregate annual audience for locally produced films. (See graphs 5 and 6) The data also showed an overall decline between the early 1990s and the present, despite a significant increase in the number of films produced and distributed over the same period.

These early findings prompted the question of whether the Scottish experience was unusual or was paralleled elsewhere and for a number of reasons Ireland was the obvious next country to consider. In film industry terms Ireland is the closest comparator to Scotland, sharing several important characteristics.[8] An English speaking Celtic country in the British Isles with a significant shared experience of centre-periphery geopolitical development over many centuries, like Scotland there was virtually no indigenous Irish film industry in the 1970s and despite the energetic work of its Government-funded Irish Film Board (IFB) between 1980 and 1987 (when it was abolished[9]), it wasn't until the IFB was reconstituted in the mid 1990s with a

---

[8] See Hill, McLoone & Hainsworth (1995)

[9] See Rocket (1988) and in particular chapter 4. 'An Irish Film Studio' and Chapter 6 'The second Film Board years' in Barton (2004)

significantly larger budget that Irish film production achieved what might be regarded as ‘take off’, reaching an average output of 11 films a year by 2004. Many of these productions have been commercially successful and many critically acclaimed, securing major awards at the Cannes, Venice, Toronto, San Sebastian and Sundance film festivals.

Ireland, despite political independence and a distinct and robust national identity also shares with Scotland the characteristic of being in effect a sub-territory of the English speaking[10] UK cinema market with the same US owned distributors and films dominating the box office in much the same rankings. However Ireland produces on average (2001-07) three times as many films as Scotland, generating an audience share six times as large.[11]

Such initial comparisons might prompt us to ask what filmmakers, distributors screen agencies and other players in Ireland may be doing differently, or better, than in Scotland. Then again there are many potential explanatory factors, ranging from policy to culture and from the supply side to demand. Rather than dive immediately into these waters, however, it seemed sensible to undertake some further analysis of the data before any attempt to formulate hypotheses about what might explain the differential performance of the two nations’ film industries.

In this paper, then, I aim to examine the relationship between production levels, the pattern of success of individual films, aggregate box office revenues and audience share in Scotland, particularly compared to Ireland and Denmark. Denmark was chosen as the third country for this initial study, not because it is the venue for the ACEI conference, but because it is the most successful comparably sized (i.e. around 5m population) country in Western Europe in terms of domestic film production (an average 33 films per year) and audience share (an average 27% of the total box office). Denmark thus provides something of a benchmark or exemplar for a country like Scotland which has long aspired to such levels of cinematic success.[12]

This paper is organised then as follows. Section 2 deals with some methodological questions, outlining the data sources and some of the issues concerning their reliability as well as the definition of terms such as ‘Scottish film’. Section 3 presents the data analysis and offers some interim observations on the relationships between production levels, patterns of success and audience share. Section 4 suggests a way of modelling those

---

[10] There is a minority language, Irish Gaelic, as there is in Scotland, both now with their own television and radio output but neither produces more than one or two Gaelic language feature films a decade.

[11] See Irish Film Board (2007, 2009)

[12] For examples of Scottish aspiration see Eadie (1973) Scottish Development Agency (1989) Mcintyre (1994). In terms of the Danish connection not only has Denmark produced one of the most striking cinematic portrayals of Scotland(in Lars Von Trier’s 1996 film *Breaking the Waves)* it has become an increasingly popular co-production partner for Scottish producers since Zentropa Entertainment partnered with Scottish producer Sigma Films to produce Lone Scherfig’s *Wilbur Wants to Kill Himself* in 2003. They have subsequently collaborated on nine Danish films and two Scottish films.

relationships that might prove helpful in a wider study. Section 5 discusses the findings and offers some brief observations on the implications for policy makers and others.

2 A note on methods, sources and definitions

2.1 Methods

There are a considerable number of factors that can be examined when trying to account for the success of individual films or, at the aggregate level, a particular film industry. The influence of stars, budget, director, certification, source material, release pattern, marketing spend and so on add up to a matrix of variables that require detailed regression analyses to determine their significance for overall film success. A great deal of valuable work has of course been done in this area by De Vany, Walls and others.[13] The intention here is much more modest (and fitting for a non-economist) and that is to examine a few simple variables – output, audience share and the pattern of box office income - that appear to be important to gaining a fuller understanding of the extent to which small countries' domestic film markets do and don't resemble the larger markets which have been the major focus of cultural economic research to date.

We noted above the rationale for comparing Scotland with Ireland and Denmark. Taking domestic output and box-office share as the key quantitative indicators of a 'successful' national cinema we begin by examining whether the distributions of box office revenues in these countries conform to the seemingly uniform Paretian distribution observed in larger markets. In section 3. we examine whether the intuitive assumption that higher revenues (which in a broadly stable market[14] equates to higher audience share) require higher levels of production holds true on a comparative basis by creating x:y scatter plots and examining the correlation between production level and audience share in the three countries to obtain a Pearson correlation coefficient ($R^{2)}$ value. We apply the same test to a larger sample of countries including two of the major European markets to establish if the relationship is constant at higher production levels. We also examine the output/share relationship for each of the three countries over a nine year period (seven in the case of Ireland), again producing a Pearson correlation coefficient for the result.

For Scotland alone we examine the same relationship over a longer (fifteen year period for which data is available) using the same R^2 test. We also plot the five-year moving averages for output and market share and test the (R^2) correlation between these.

In section 4. we suggest a simple model of the distribution of films and gross income across box office categories. A formula for allocating titles to income bands as production increases is presented and gross income for each band calculated as the product of the expected number of titles and the mean

---

[13] De Vany (2004) is a particularly useful collection in this respect.

[14] In the period under consideration total audience levels have on a slightly rising trend.

expected income in each band (the latter derived from observations of actual income distribution in the territories under examination).

2.2 Sources

The box office data used in this paper come from a variety of sources including the national film agencies of Scotland, Denmark, Ireland, Finland, Norway, Sweden and the United Kingdom, the European Audiovisual Observatory and trade journals (Screen Finance, Screen International).

Box office data are reported in a variety of formats and it is not always clear, for example, whether VAT has been included in revenue figures or not. Similarly figures may be revised in consecutive annual reports to reflect late returns of information or films that have been re-released and this can give rise to inconsistent figures for the same year. Different methodologies for calculating box-office figures may also be used so that, where financial returns from exhibitors are not available for some years, agencies may use the admission figures which have been reported and then estimate box office calculated by using an average admission price. These discrepancies, however, are unlikely to have a significant effect on the broad ratios that we are concerned with here.

A more substantial problem is that of definition. While there is at least a fiscal definition of what constitutes a British, Irish or Danish film there is no equivalent for Scotland, which does not constitute a separate jurisdiction for tax relief purposes. Indeed since the fiscal definition of a British film includes *The Dark Night*, *Batman Begins* and *Alien vs. Predator* it is clearly not as reliable an indicator of British 'content' as we might wish. [15] A film such as the 2002 UK-Irish co-production *The Magdelene Sisters*, written, directed and produced in Scotland by a Scottish company but set in Ireland is considered to be Scottish in Scotland, Irish in Ireland and British in most of the rest of the world. It is also an interesting example, by no means unique, of a film which was more popular in other European countries (France and Italy) than in either of its 'home' territories and more popular in the US than any other single territory. Indeed it was almost as popular here in Denmark as it was in Ireland. This example alone should remind us that domestic box office is not the only measure of a national cinema.

Co-productions such as *The Magdalene Sisters,* where the creative and production impetus comes from one country (Scotland) but the content and location is firmly identified with another (Ireland), whose substantial role in financing the film gives it further traction as an 'Irish' film, pose one kind of definitional problem. Similar issues arise in relation to the Scottish-set films of Ken Loach such as *My Name is Joe* (1998) and *Sweet Sixteen* (2002) which had substantial Scottish creative, production and financial input and were shot there, but by a famously English director working through an English production company. Ditto films such as *The Last King of Scotland* (2006) conceived and produced by expatriate Scots from Scottish source material but otherwise with little cultural or commercial connections to Scotland or a film

[15] There is a useful discussion of this issue in relation to the construction of a database of the audiovisual field in developing countries in Cocq and Levy (2006).

such as the *Greyfriars Bobby* (2005), an iconic Scottish figure but apart from location the London-produced film had almost no Scottish input other than a small amount of finance from Scottish Screen (although it did secure 70% of its disappointingly miniscule audience of 80,000 people in Scotland).

As there is no mutually satisfactory set of industrial and cultural criteria with which to define a Scottish film, for the purposes of this analysis I have taken a broad view, including all those titles with a recognisably Scottish leading creative, production or financial input. This may have the effect of slightly inflating both the output and the size of the Scottish audience for Scottish film but is unlikely to alter the broad ratios with which we are concerned. Indeed a narrower definition would simply make the Scottish picture that much worse but would not fundamentally alter the bigger picture.

3 Film production, success and audience share

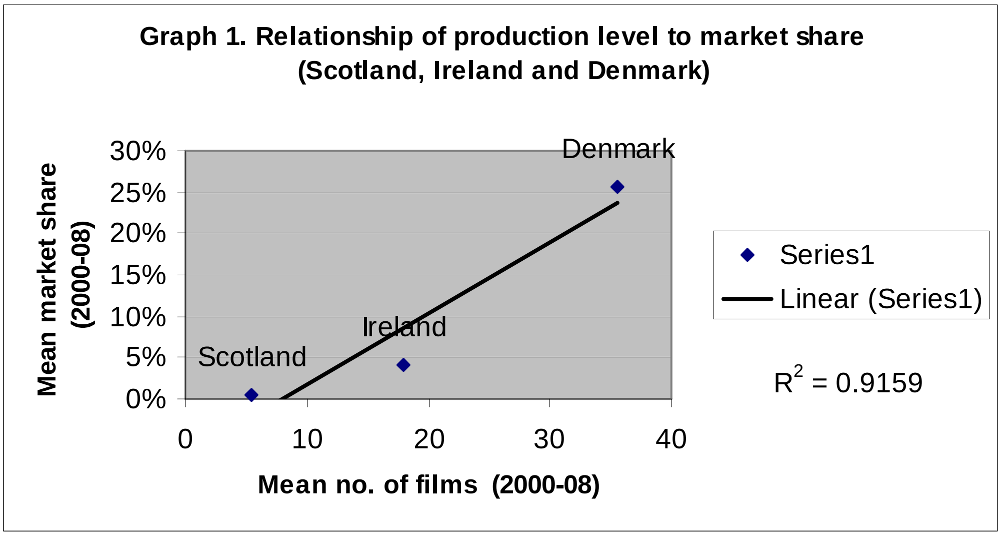
In this section we consider the relationship between the level of film production, market share and the pattern of box office performance in the three countries.

The box office data (Table 1, Graph 1) for Scotland, Ireland and Denmark over the period 2000-2008 shows that, despite very different levels of film production and share of the total domestic box office, the three countries' local productions broadly conform to the familiar Paretian or '80/20' distribution of revenues with the top 20% of releases accounting for between 65% and 79% of the total box office generated by local films.

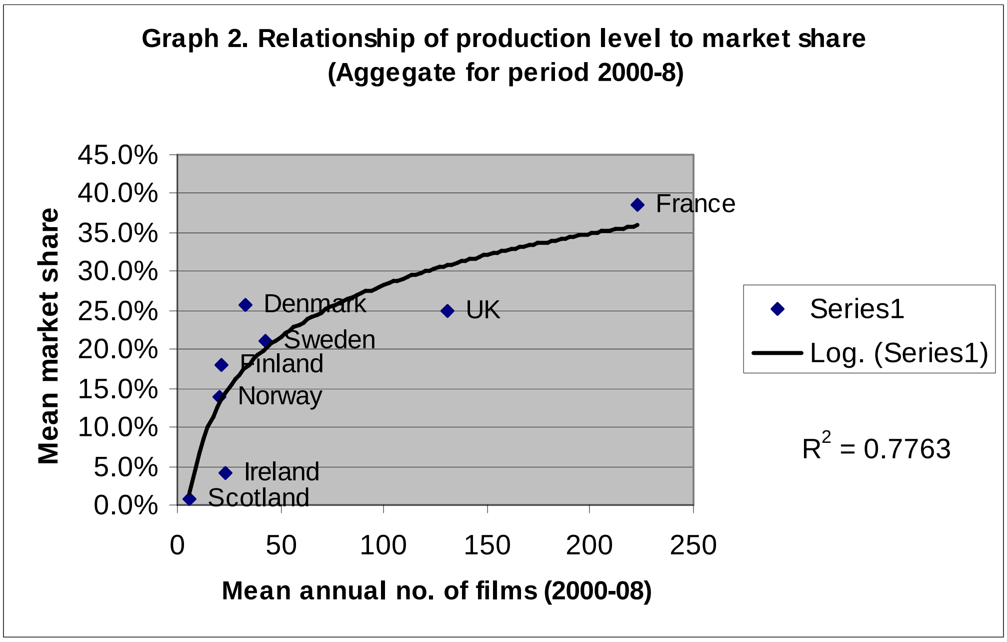
Table 1.	No. of titles (2000-08)	Domestic Box Office for local films (€million)	Mean share of total domestic box office	Standard Deviation	% of box office generated by top 20% of films
Scotland	33	5.2	0.5%	0.5%	79%
Ireland	109	40.7	4.1%	3%	73%
Denmark	279	179.0	25.7%	5%	65%

3.1 Production level and market share

Comparison of the aggregate market share achieved by each of the three country's domestically produced films over the 2000-08 period (Graph 2.) suggests an almost linear relationship between market share and the mean annual number of films produced.



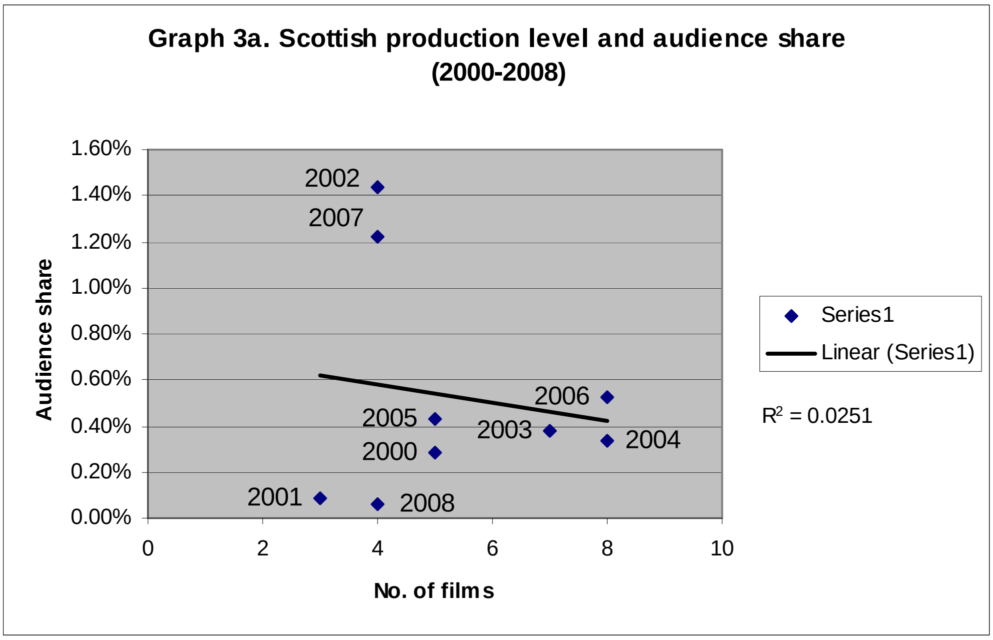
Taking the largest sample of European countries for which we have comparable data, including three of the four other Nordic countries and the much larger markets of the UK and France, we still see an apparently strong relationship between volume and market share, although not the linear one suggested by the Scottish, Irish and Danish cases.

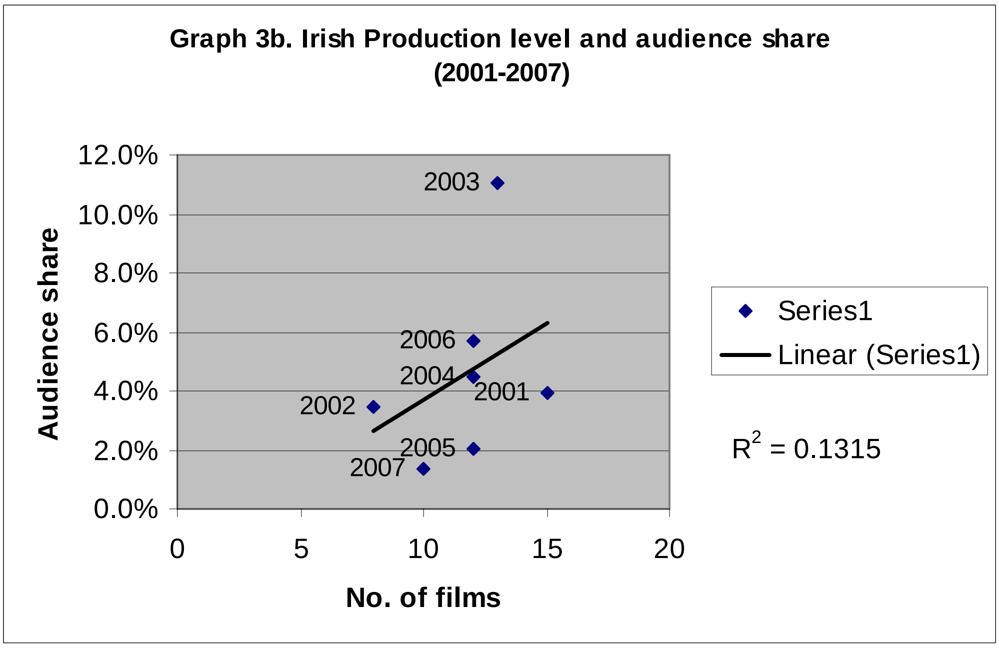


Amongst the four Nordic countries Danish film's average 26% share of its domestic market is the second highest in Europe while it will probably come as no surprise to anyone familiar with its cinema that France has both the highest output level and the largest market share.

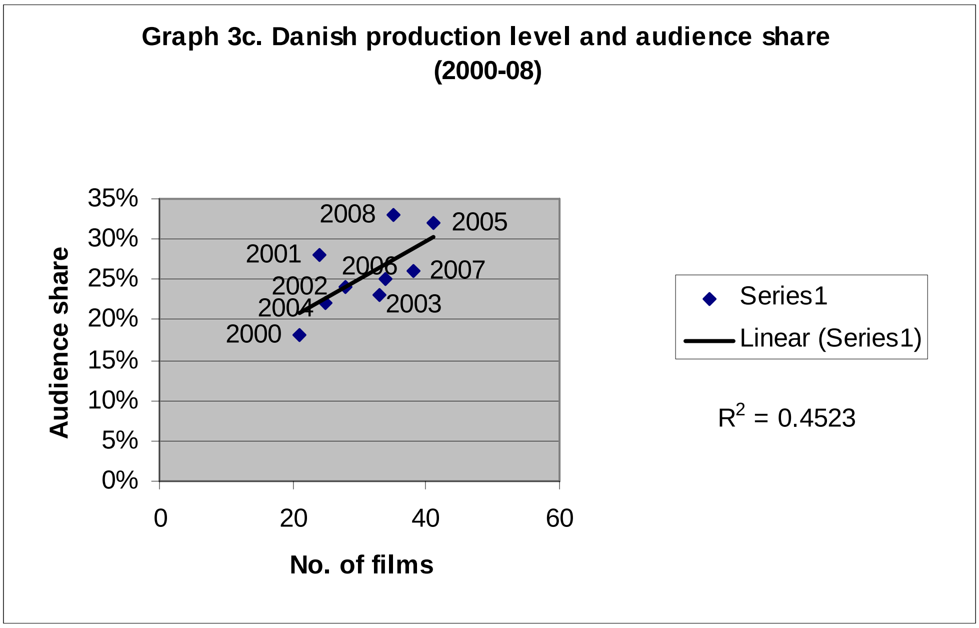
While this larger sample of countries appears to confirm an association between mean production level and market share over time it also suggests a levelling off effect as the share approaches 40%. The 38% average share achieved by France over the past eight years is the highest of any European country and it has sustained this level since 1980 (CNC, 2010). It is worth noting here that in terms of audiovisual policy France has for many years also been the most actively interventionist and protectionist European state[16].

At the other end of the scale Scotland's audience share appears to be in step with the very low level of production, although as we have already seen (Table 1.) it conforms in broad terms to the Paretian distribution of success. However when we look at each individual country over the same period the relationship between output and share breaks down.

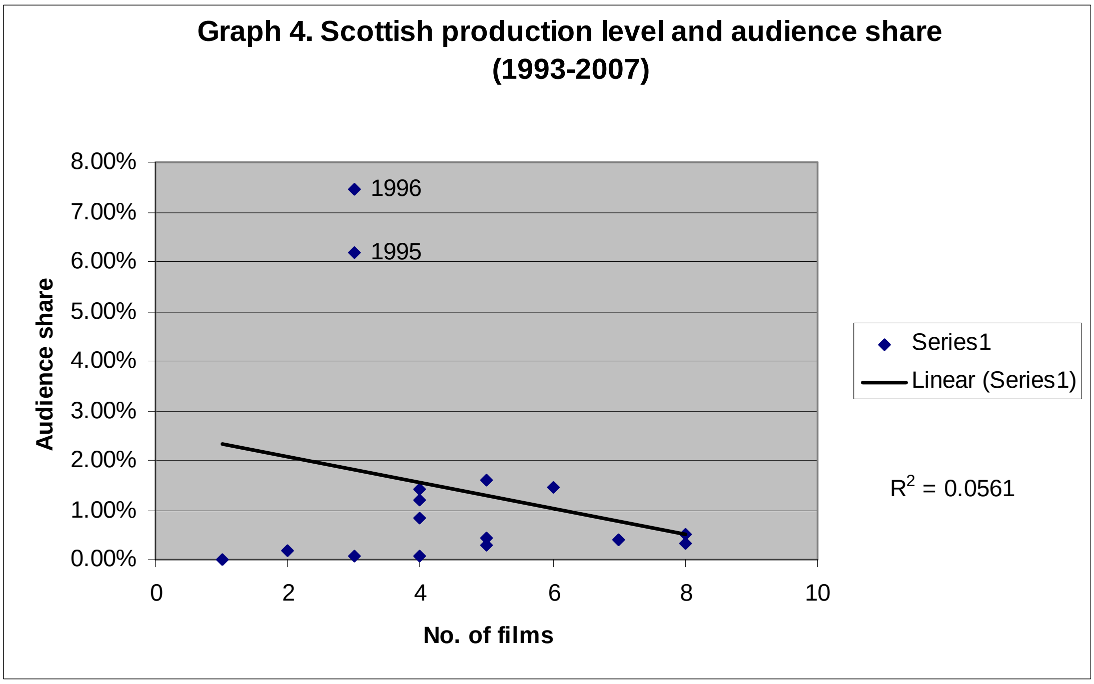




16 See Cocq, Dantec and Levy-Hartmann (2006) for an analysis of the economic impact of French cinema policy.



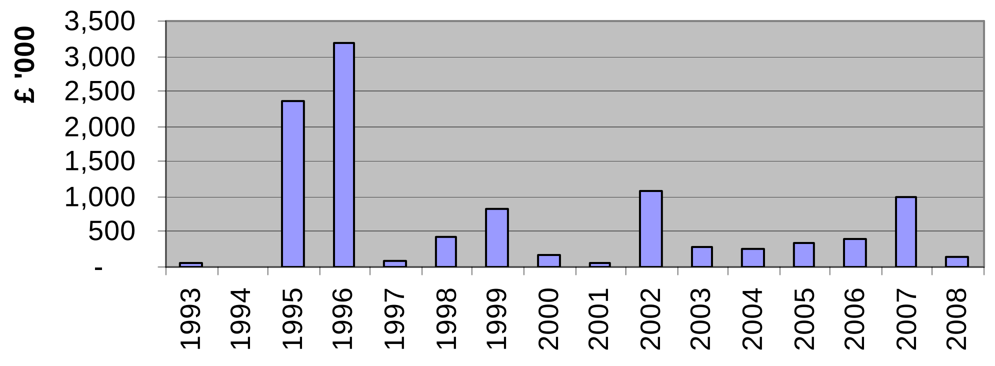
The data for Scotland over the period 2000-08 shows a weak positive correlation between production volume and market share (R^2=0.17). The Irish data for a similar period (2001-2007) shows a slight positive association between production and audience share while the Danish data shows a moderate positive association (R^2=0.45).



The availability of Scottish data for a longer period allows us (Graph 4.) to extend the examination back to 1993, showing a weak negative association between production level and audience share. (R=-0.12, R^2=0.016)

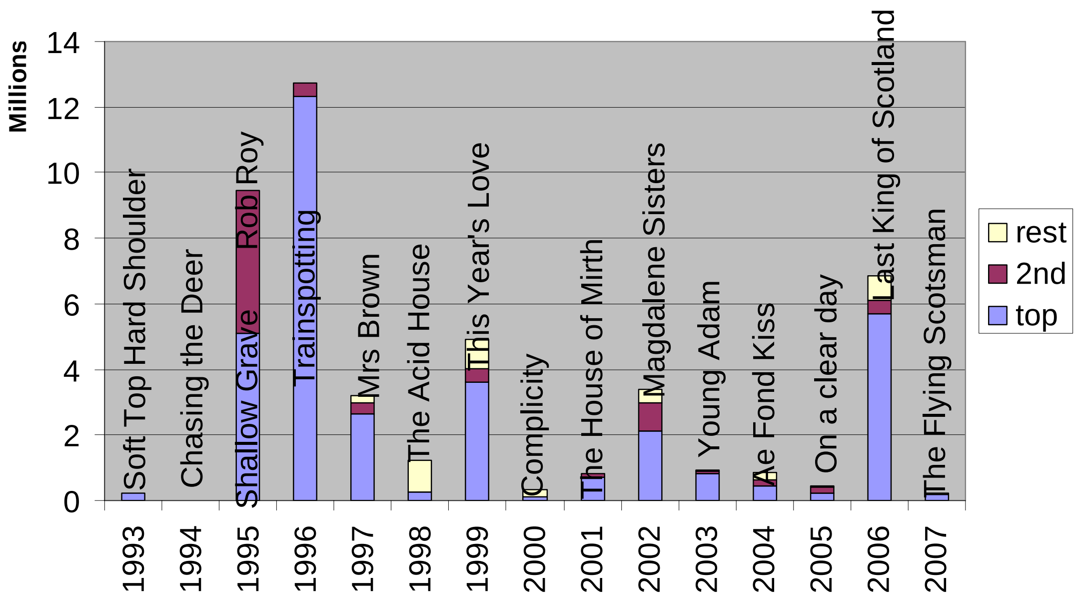
However this extended time period also includes two exceptional years (1995 and 1996) which demonstrate how volatile market share can be when the base level is so low and high-performing outliers dramatically increase the total. This can easily be seen when we look at (Graph 5a.) the Scottish box office for Scottish films between 1993 and 2008.

Graph 5a. Gross Box Office in Scotland of Scots film (1993-2008)



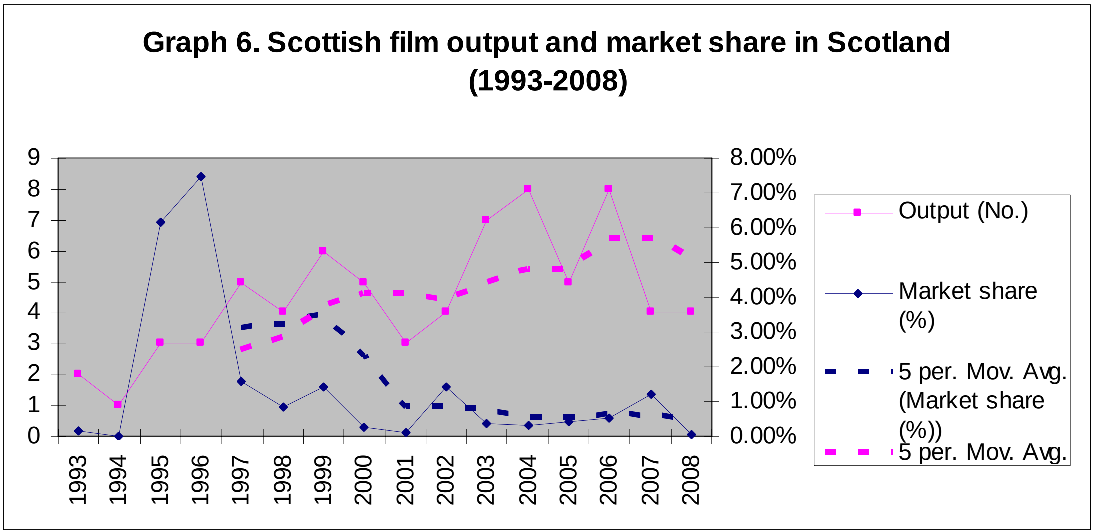
In the period 1993-2008 the mean annual Scottish box office for Scottish film was £716,529, the median was £220,000 with a standard deviation of £951,712. The four worst years saw an average of just over £41,000 while the four best averaged over £2million. The very small number of films released each year (between 1 and 8) means that the occasional blockbuster has a profound effect on the aggregate performance of Scottish film in a given year. (Graph 5b.)

Graph 5b. UK Box Office for top Scottish film, runner up & the rest (1993-2007)



With such low levels of production a single film such as *The Last King of Scotland* increased the market share for Scottish film in 2006 to over 2% from around 0.2% the previous year. Given this extreme susceptibility to individual events it would seem unwise to attempt to relate audience to production levels on such a short time scale.

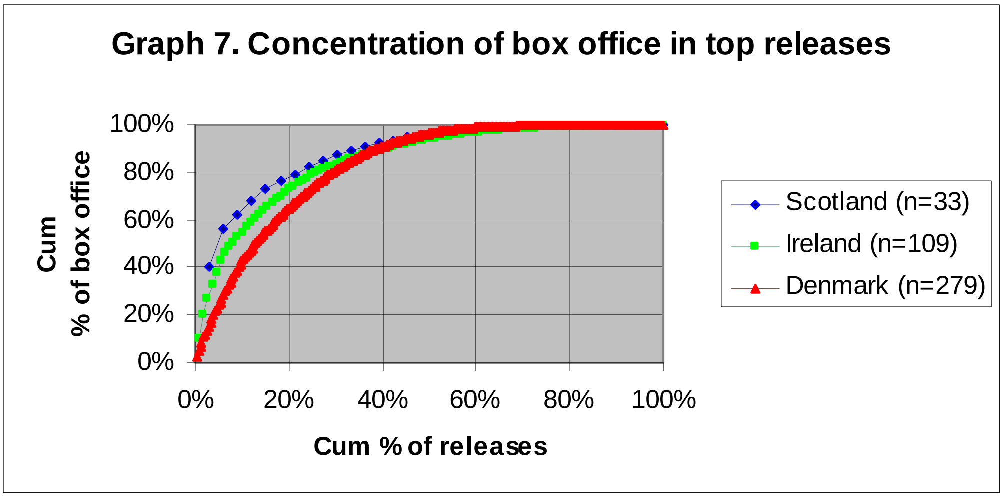
Taking a five-year moving average for volume and market share (Graph 6.) reveals both an absolute decline in market share and an apparently negative association (R= -0.8) between it and production levels.



Despite the volume of domestic production in Scotland doubling from just under three films a year in the mid 1990s to six a year in the mid 2000's, market share in the corresponding period decreased from just above 3% to just above 0.5%. However the pronounced variability in individual and, as a result, aggregate box office revenues and audience share clearly remains a key characteristic of the Scottish situation and leads us to consider how the pattern of individual film performance relates to overall revenues as the scale of production increases.

.

3.2 Production level and the distribution of revenues



We noted earlier in this section (Table 1.) the similarity in the rank/revenue relationship for locally produced films in Scotland, Ireland and Denmark, providing further confirmation of De Vany's conclusion that a Paretian distribution in which around 20% of releases generate 80% of revenue is "a natural order, durable over time and place." (De Vany 2004, p86)

While this suggests that, regardless of scale, roughly the same small proportion of releases will produce the majority of total revenue, it does not tell us how changes in scale (i.e. the volume of production) affect the pattern of revenues within that distribution. This is potentially significant because we can legitimately ignore the long tail of extremely poorly performing titles for the purposes of examining how those films that are still ‘in the game’ perform. Looking in more detail at the distribution of these films’ box office revenue in segments may help us to understand if some countries are performing ‘better’ as well as ‘bigger’.

Taking the same time period as in our initial analyses (2000-08) and tabulating the number and proportion of films in each €500,000 box office increment up to the highest level achieved across the three countries we can construct a histogram (Table 2. and Graph 10) showing the distribution of revenues.

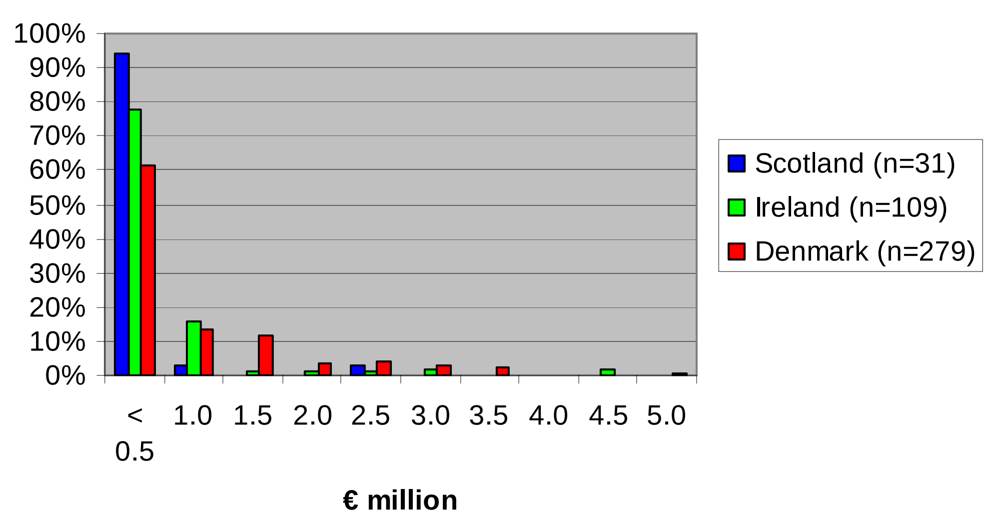
Table 2. Number of films in each €500k band of Box Office revenue.

Box office	Scotland	Ireland	Denmark
<500,000	31	85	171
<1,000,000	1	17	37
<1,500,000	0	1	33
<2,000,000	0	1	10
<2,500,000	1	1	12
<3,000,000	0	2	8
<3,500,000	0	0	6
<4,000,000	0	0	0
<4,500,000	0	2	0
<5,000,000	0	0	2

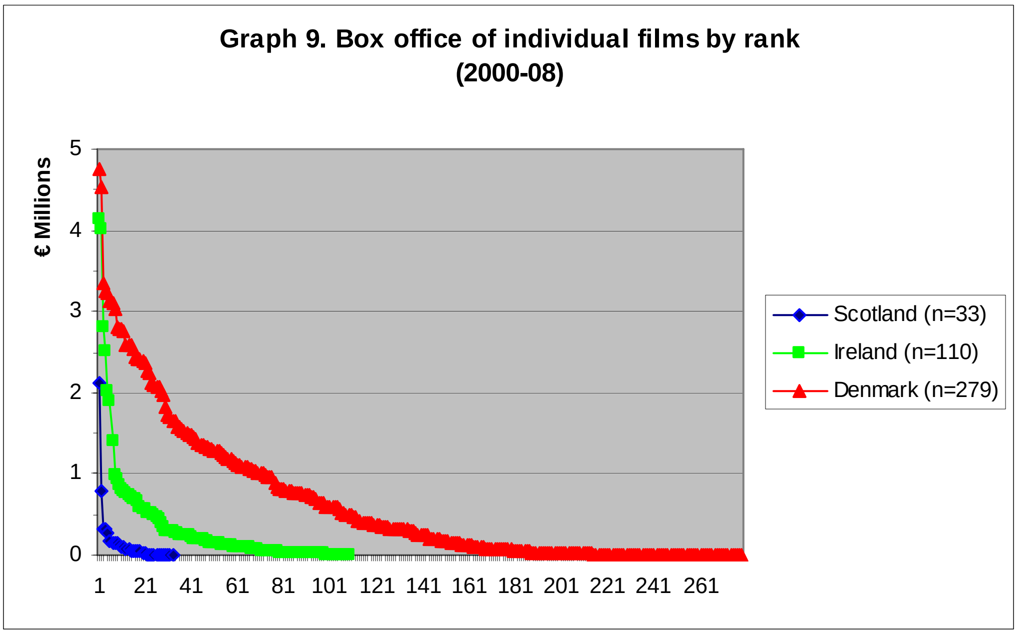
Pearson Correlation Coefficient

R^2	*Scotland*	Ireland	Denmark
Scotland	1		
Ireland	0.971	1	
Denmark	0.972	0.967	1

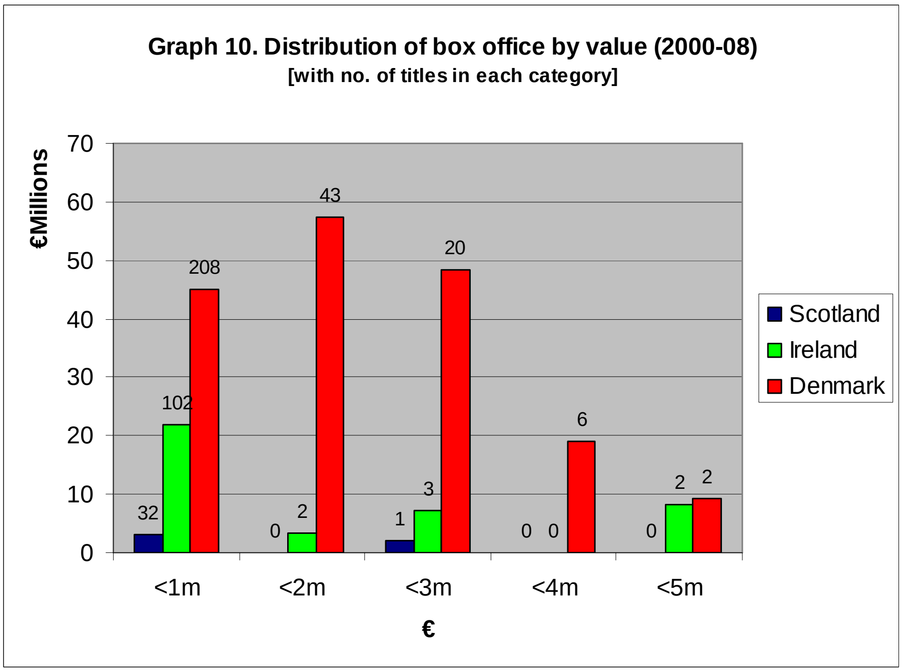
Graph 8. Proportion of films in each Box Office band



We can see (Graph 8.) that Denmark has a greater proportion of titles in the higher value bands compared to Ireland which in turn has more high performers than Scotland. Denmark thus produces both more in absolute terms and a greater proportion of high value films than Ireland or Scotland. When we compare the pattern of these distributions we find that as the output of films increases more box-office categories are occupied but also that the contribution to total revenues of the central part of the box office range becomes greater relative to the revenue contributed at either end of the range.



Although the top 20% of titles still command the lion's share of total revenues they are now spread across a wider range of positions on the box office 'ladder'. If we look at the total value of each box office category in five wider bands this becomes clearer (Graph 10).



In Scotland's case we can see that all but one of the 33 films are in the under €1m category, generating 59% of total revenue while the single film in the €2-3m range accounts for the remaining 41%.

In Ireland the 102 films in the under €1m range yielded a similar proportion to Scotland, in this case 54% of total revenue. Five of the remaining titles in the €1m to €3m range produced a further 26% of revenue and the remaining two relatively high performing films in the €4-5m range generated the remaining 20% of revenue.

In Denmark by comparison the 208 titles in the under €1m range generated just 25% of revenue. 43 titles between €1m and €2m generated the next 32% of revenue, 20 titles between €2m and €3m and 14 between €3m and €4m added a further 47% and two high performers in the €4m to €5m range produced the remaining 5%.

4 A SCALE MODEL FOR FILM SUCCESS

The box office distribution data we have considered from Scotland, Ireland and Denmark seems to conform to a pattern which allows us to suggest a model (Tables 3. and 4.) of how increasing production level leads to a distribution of box office revenues that remains consistent with the apparently universal Paretian rank/revenue distribution but still produces a concentration of aggregate revenues in the middle performance bands.

The simplified model we propose resembles a human pyramid with prizes at each level. The pyramid gets bigger by adding layers of progressively larger numbers at the bottom while the upper layers achieve greater heights thus securing larger rewards. For the purposes of the model we have applied a scaling factor of three each time a layer is added at the bottom of the pyramid.

For any given volume of production the allocation of films to each level of performance is given by the equation:

$$\ell x = \frac{1}{3^{x}} (2n+1)$$

Where ℓx is the number of films that will occupy revenue level x and n is the total number of films to be allocated across the revenue levels.

Applying this model to four imaginary countries' film output (Tables 3a.,b.,c.) we have Country A producing 13 films, 9 of which occupy the lowest box office range, 3 the next level and 1 in the next and its highest level. Country B produces 40 films, tripling the number in the bottom level and in the second and third and introducing 1 into the fourth level. Countries C and D follow this pattern which it can be seen follows a geometric pattern in which the number of films at each level is three times the preceding level. An important feature of this model is that it preserves something approaching the Paretian rank/revenue relationship as the top third of titles consistently generate 80% of total revenues.

The revenue generated by each country (Table 3b.) is obtained by multiplying the number of films in each category by the specified average box office for that band[17].

The model is tested (Table 3c.) by comparing the predicted values for revenue with those actually observed in the three countries under discussion and a further three, Norway, Finland, Sweden.

Simplified Box Office model for small countries				
Table 3a. Volume of titles in each category by country				
Category €m	A	B	C	D
<1	9	27	81	243
<2	3	9	27	81
<3	1	3	9	27
<4		1	3	9
<5		0	1	3
<6				1
	13	**40**	**121**	**364**

Simplified Box Office model for small countries				
Table 3b. Revenue generated in each category by country				
Yield (€m)	A	B	C	D
0.2	2	5	16	49
1.2	4	11	32	97
2.2	2	7	20	59
3.2	0	3	10	29
4.2	0	0	4	13
5.2				5
	8	**26**	**82**	**252**

Simplified Box Office model for small countries				
Table 3c. Predicted and actual revenue for six countries				
Country	Observed no. of titles (2000-8)	Predicted revenue €m	Actual revenue €m	Error (%)
Scotland	33	22	5	17 (331%)
Ireland	109	74	40	34 (85%)
Norway	154	105	135	-30 (-23%)
Finland	174	118	85	33 (39%)
Denmark	279	190	179	11 (6%)
Sweden	327	222	234	-12 (-5%)
Correlation coefficient (Pearson) of predicted and actual revenue: R=0.96 $R^2 =$ 0.92				

[17] Examination of the empirical data for a range of small countries and for the UK indicate that the average figure within any given band will be in the bottom fifth to third of that band, we have used the second decile (0.2 1.2,2.2 etc.) in the model.

While the model clearly fails to accurately predict revenues at small levels of production such as Scotland's it does appear to become more accurate at higher levels. This may reflect some dampening of the effect which extreme outliers have on total revenues when production levels are in single figures, as they are in Scotland.

5 Conclusions

It is unlikely to come as a surprise to most people that increasing output is a necessary, if not a sufficient condition for a domestic film industry to achieve a significant share of its domestic or any other market. The requirement to continuously produce sufficient unique products such that enough of them are able to successfully compete against a vigorous supply of foreign imports with an apparently built-in consumer preference is not for the faint-hearted. Nonetheless European filmmakers, distributors, exhibitors, public agencies and Governments persist in their efforts to sustain or, as in Scotland's case, secure a viable indigenous film industry.

The evidence we have examined suggests there may be a logarithmic-type relationship between average film output and average audience share. It is certainly plausible that in the early stages of development of a film industry, where output is in single figures, the difference one or two films being financed or not and one or two doing well or not can have a major effect on the overall performance for that year. As annual output rises into the twenty to thirty range there are sufficient films for a Paretian-type pattern to become visible at shorter time-intervals so we might reasonably expect to regularly see the top 20% titles securing the majority of the audience for indigenous films. This is indeed exactly what we see in the case of Denmark (Table 4.).

Table 4. Top 20% of Danish films' share of domestic and total audience 2000-2008

	Output	Top 20% domestic films share of domestic audience	All domestic films share of total audience	Top 20% domestic films share of total audience
2000	21	63%	18%	11%
2001	24	66%	28%	18%
2002	28	70%	24%	17%
2003	33	58%	23%	13%
2004	25	59%	22%	13%
2005	41	74%	32%	24%
2006	34	62%	25%	16%
2007	38	63%	26%	16%
2008	35	66%	33%	22%
Median		**63%**	**25%**	**16%**

Above an output of around forty films a year where the audience curve levels off, each percentage point increase in audience share would seem, from the UK and French experience, to require progressively more productions.

At the Scottish scale of production it would seem fair to conclude that we should not read too much into the evident decline in market share during a period in which production doubled from a mean of three films per year in the early 1990s to six in the late 2000s. Our analysis suggests that this is still not a level of production that can outweigh the extreme variability of individual instances and that therefore filmmakers, investors and public agencies cannot expect consistent performance from year to year. Ireland, although enjoying an average eight times higher audience share for three times the level of production still experiences similar volatility (in both cases the standard deviation of audience share is broadly equal to the mean – see Table 1.) and it is only when we get to Danish levels of production that the share remains reasonably constant.

On the other hand the spread of performance that Scottish films display over a longer period is broadly congruent with that of Ireland and Denmark and indeed with the seemingly universal Paretian rank/revenue relationship. It was this observed effect that led us to construct a model of how total revenues and how they are distributed across income bands might change as we move from a low output country to a higher one. The model, although clearly imperfect and in need of considerable refinement, does suggest that there is an underlying pattern to the distribution of revenues and their aggregate value that is, over time, a function of output. Further research is required to establish whether the model distribution of revenue across box office bands is empirically verified by the box office data and also, for example, whether there is any correlation to budget and/or marketing spend[18].

Is size alone a guarantee of success in quantitative terms? The apparent uniformity of the Paretian hit/miss ratio, irrespective of geography or scale, suggests that it may be. Does this mean that ‘nobody has to do anything in particular’ to secure a ‘respectable’ (in the European context somewhere between 30 and 40%) share of the audience other than simply make more films? This seems unlikely - despite the unpredictability of individual successes it can still be argued (Albert 2006) that there is a great deal of skill, discernment and talent – and perhaps not a little luck – involved in the conception and execution of any film that gets made and perhaps no less effort expended in ensuring worse films do not get made.

A more plausible explanation – one which deserves further investigation - is that as higher volumes of production are consistently achieved positive feedback mechanisms begin to operate that improve the selective development and reward of both talent and acquired expertise, smoothing out the chaotic and unpredictable pattern of ‘youth’ into a more predictable, in aggregate terms, ‘maturity’. The fact that many more individuals or

---

[18] The relationship between budget and box office performance is not clear (see De Vany (2004, pp132-134) although some useful work has been done in the UK by the UK Film Council to examine whether production type e.g. 100% national production versus co-production is significant. (See UK Film Council 200, pp 61-62)

enterprises enter the game, keeping the overall hit/miss ratio broadly constant, may obscure a relative improvement amongst some players, those that are progressively able to deploy greater skill, improved purchasing power in the talent market or privileged access to finance and distribution to the development, production and distribution of their projects. There may in addition be a further positive feedback mechanism in terms of the cultivation of audience demand as cinema-goers develop a greater appetite for indigenous product. Similarly as overall volume increases the potential for specialist genres/age groups etc. to be addressed may, in a self-similar process, allow each to exceed the critical threshold where a Paretian ratio of hits to misses emerges.

To temper such an optimistic scenario however we must bear in mind that in many if not most small European countries film production is conducted on an atomised basis by micro-enterprises with limited if any capacity to offset failures against successes (Northern Alliance 2010). Runs of successes being inherently unlikely, the capacity of such enterprises to absorb losses is extremely limited, a corollary of which is that both risk and reward (in the form of rights ownership) transfers to financiers with a substantial portion born by public bodies. They in turn are likely to remain critical to securing any step change in national production levels as they must bear at the very least the transitional risk over what may be a lengthy period of time. Considering the typical performance of individual films or indeed individual film companies, the financial rate of return will be overwhelmingly negative but if significant audience share, critical success or the long term achievement of a sustainable industry are the principal policy objectives this would seem to be a price that must be paid. In that sense bigger is indeed better.

Areas for further research

More detailed analysis of the pattern of box office performance, across a wider range of countries is needed, to test these provisional conclusions about the relationship between production level and market share and our model of the pattern of film revenues as production levels rise.

Consideration could usefully be given to a wider range of variables and whether they are more or less important in small countries than in larger markets. These might include key talent experience i.e. the writer, director or producer's opus number; the individual and aggregate impact of specific genres, cast, certification, adaptation or original work on audience levels.

The question of whether there are distinct patterns of success for what are conventionally distinguished as 'commercial' and 'arthouse' films is particularly significant for those small countries where public investment is generally weighted towards the latter.[19]

Afterthoughts

All of the foregoing suggests that it may be possible to 'know something' about the shape, size and direction of small countries' domestic film industries even if we cannot predict what will happen to any given film. It suggests a

---

[19] See Holbrook and Addis (2008) for an interesting discussion of this question.

possibly fruitful route for further research that might help inform ‘macro’ film policy i.e. how much to spend, how many films to aim for and therefore, perhaps, whether to spread available finance thinly across more films rather than thickly across fewer. It might even help explain to policymakers and observers what return (in aggregate financial and audience terms) they can reasonably expect to receive given a certain level of film production. It won’t, of course, help anyone to decide which films to make – that remains the domain of wisdom, talent, skill where we must hope that better leads to bigger and of course vice versa.

6 References

Acheson, K. & Maule, C.J. (2005) Understanding Hollywood's organisation and continuing success. In Sedgwick, J. & Pokorny, M.(eds.) *An Economic History of Film.* London: Routledge.

Albert. S (2006) *Some people know some things: Do some people know how to avoid absolute failures in the US film industry?* Conference paper ACEI 2006.

Barton, R. (2004) *Irish National Cinema*. London, Routledge.

Bourdieu, P. (1993) *The field of cultural production: essays on Art and Literature.* London: Polity.

CNC (Centre National Du Cinema et de l'image animee) (2010) *Attendance*. http://www.cnc.fr/CNC_GALLERY_CONTENT/DOCUMENTS/statistiques/par_secteur_EN_pdf/Attendance.pdf. Accessed 13/5/2010

Cocq, E., Dantec, A. & Levy-Hartmann, F. *How Much Do You Love Me? An Economic Analysis of the French Cinematographic Policy.* Presentation 14th International Conference on Cultural Economics (ACEI) Vienna, Austria 2006.

Cocq, E. and Levy, F. (2006) Audiovisual Markets in the developing world. *Trends in Audiovisual Markets – Regional Perspectives from the South*, UNESCO, 2006.

De Vany, A. (2004) *Hollywood Economics – How extreme uncertainty shapes the film industry.* London: Routledge.

David Graham & Associates Ltd (2003), *Audit of the Screen Industries in Scotland. A Report for the Scottish Executive*, Pact in Scotland, Scottish Enterprise, Highlands and Islands Enterprise, and Scottish Screen.

Dick, E. (ed) (1990) *From Limelight to Satellite: A Scottish Film Book*, London: British Film Institute

Eadie, D. We can't say meanwhile any more. *Scottish International* September 1973: 25-27

Elliott, C. & Simmons, R. (2007) Determinants of UK box office success: The impact of quality signals. Working paper, Lancaster University.

European Commission (2001) *Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on certain legal aspects relating to cinematographic and other audiovisual works*. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52001DC0534:EN:NOT Accessed 10/5/2010

Goldman, W. (1983) *Adventures in the Screen Trade*. Futura, London.

Hartog, S. (1983) State Protection of a Beleaguered Industry. In Curran, J. & Porter, V (eds.) *British Cinema History.* London:. Weidenfield.

Hill, J. (1994) The Future of European Cinema: The economics and culture of pan-European strategies. In Hill, J, McCloone, M. & Hainsworth, P. (eds.) *Border Crossing: Film In Ireland, Britain and Europe.* London: British Film Institute.

Holbrook, M & Addis, M (2008) Art versus commerce in the movie industry: a Two-path Model of Motion-Picture Success. *Journal of Cultural Economics,* 32:87-107 DOI 10.1007/s10824-007-9059-2

House of Commons Culture Media and Sport Committee (2003) *The British Film Industry*. London: House of Commons. http://www.publications.parliament.uk/pa/cm200203/cmselect/cmcumeds/667/667.pdf accessed 10/5/2010

Irish Film Board (2007) *Creating a sustainable Irish Film and Television Sector: A review of section 481 film relief.* http://www.irishfilmboard.ie/files/reports/IFB%20Indecon%20submission%20-%20Creating%20a%20Sustainable%20Film%20and%20Television%20Sector%20June%202006.pdf accessed 13/5/2010

Irish Film Board (2009) *Irish Film Industry Review 2005-2009* *http://www.irishfilmboard.ie/files/reports/IFB_Review_Web.pdf* accessed 13/5/2010

Jansen, C. (2005) The Performance of German Motion Pictures, Profits and Subsidies: Some Empirical Evidence. *Journal of Cultural Economics*, 29: 191-212 DOI: 10.1007/s10824-005-1157-4

MacPherson, R. (2009) Shape-shifters: Independent Producers in Scotland and the journey from cultural entrepreneur to entrepreneurial culture. In Murray, J., Farley, F & Stoneman, R. (eds.) *Scottish Cinema Now.* Newcastle Upon Tyne: Cambridge Scholars Publishing.

McKenzie, J (2007) Increasing return to information and Pareto's Law: New Australian Box Office Revenue Evidence *36th Australian Conference of Economists*, Hobart, TAS, Australia, 26th September 2007 http://www.aftrsmedia.com/CSB/wp-content/uploads/mckenzie/Pareto%20Article.pdf accessed 19/11/2009

Martin-Jones, D. Scotland: *Global Cinema Genres, Modes and Identities*. Edinburgh: Edinburgh University Press.

McIntyre, S. (1994) Vanishing Point: Feature Film Production in a Small Country. *Border Crossing: Film In Ireland, Britain and Europe, eds. Hill, J, McCloone, M. & Hainsworth, P.* London: British Film Institute.

Miller, T. (1996) The crime of Monsieur Lang: GATT, the screen and the new international division of cultural labour. *Film Policy, ed. Moore, A.* London: Routledge.

Neely, S. (2008) Contemporary Scottish Cinema. In Blain, N. & Hutchison, D. *The Media in Scotland.* Edinburgh: Edinburgh University Press.

Northern Alliance (2010) *Analysis of the corporate finance of SMEs in the UK Film Industry.* London: Northern Alliance/UK Film Council http://www.ukfilmcouncil.org.uk/media/pdf/8/a/Analysis_of_the_Corporate_Finance_of_SMEs_in_the_UK_Film_Industry.pdf accessed 14/5/10

Parker, A. (2002) *Building a sustainable UK Film Industry*. http://www.ukfilmcouncil.org.uk/media/pdf/q/r/BaSFI.pdf accessed 10/5/2010

Petrie, D. (2000) *Screening Scotland*. London: British Film Institute.

Rocket, K. (1988) History, Politics and Irish Cinema in Rockett, K., Gibbons, L. & Hill, J. Cinema and Ireland. London, Routledge.

Scottish Development Agency (1989) *Report of the Scottish Film, TV and Video Working Party.* Glasgow

Sorlin, P. (1991) *European Cinemas, European Societies.* London: Routledge.

UK Film Council (2009) Statistical Yearbook, http://www.ukfilmcouncil.org.uk/media/pdf/2/p/2009.pdf accessed 12/5/2010

Walls, D. (2005) Modelling Movie Success when 'Nobody Knows Anything': Conditional Stable-Distribution Analysis of Film Returns. *Journal of Cultural Economics 29: 177-190 DOI: 10.1007/s10824-005-1156-5*

Scotland and England are two nations divided by their experience of history. That divide was never wider than during the Wars of Independence in the 13th and 14th centuries when a chance event brought an era of relative friendship to an end in violent conflict. The Succession Crisis. The Adobe Flash player and Javascript are required in order to view a video which appears on this page. You may wish to download the Adobe Flash player. Alexander III dies: A History of Scotland. The crisis began in 1286 when Alexander III fell from his horse on the sands of Kinghorn and broke his neck. After Alex It has the smallest area of all four constituent countries. The Irish potato famine had a massive impact on the Irish population due to death from starvation and immigration because of it. Northern Ireland however is considered to have a healthy population. It isnâ€™t asâ€urbanâ€ or built up as England is and it faces similar issues to Scotland in the sense that some of its landmass is uninhabitable due to mountains and lakes etc: Wales (8.55% of U.K. landmass, 4.72% U.K. population). Wales has the second biggest population density in the U.K. despite only making up 8.5% of the land.Â Wales has a similar issue to Scotland in that it has mountainous uninhabitable land that is also poor for farming.